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THE USE OF LAND IN TEACHING AGRICULTURE IN SECONDARY SCHOOLS.

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INTRODUCTION.

This bulletin is the result of an attempt to determine how land is being used in the teaching of agriculture in secondary schools in the United States. In gathering the material upon which the bulletin is based two questionnaires were sent out, one in April, 1914, to all high schools receiving State aid for agriculture, to special agricultural schools, and to normal schools known to have courses in agriculture. To this 400 replies were received. In September another questionnaire was sent to the same high schools and special agricultural schools, but not to the normal schools, which were omitted because a great part of their instruction relates to school gardens and not to work tending toward farm practice. Out of the 385 schools replying to the first questionnaire, 257 reported that some land was used in connection with their agricultural instruction. The schools so reporting were distributed as follows: Ten in the New England States,

NOTE.—This bulletin describes how land is being used in the teaching of agriculture in secondary schools and discusses some of the problems involved. It is written to aid all persons who are engaged or interested in the teaching of agriculture.

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16 in the Middle Atlantic, 31 in the East North Central, 86 in the West North Central, 15 in the South Atlantic, 36 in the East South Central, 50 in the West South Central, 6 in the Mountain, and 7 in the Pacific.

SCHOOLS REPORTING SCHOOL FARMS AND FARM ANIMALS.

Of the 27 special agricultural schools, 25 reported that they had land and 2 that they had none. Of the 259 high schools, 166 reported land, and of the 101 normal schools, 66. Of schools with land, 20 of the 25 special schools, 43 of the 166 high schools, and 19 of the 66 normal schools reported that they had farm animals. In other words, of the 257 schools with land only 82 reported farm animals. In many instances the farm animals consisted of a horse or team which was used on the farm and for driving by the instructor in agriculture.

SIZE AND TENURE OF THE FARMS.

The reports indicated that 40 of the 257 school farms had 1 acre or less; 23, 2 acres; 23, 3 acres; 10, 4 acres; 21, 5 acres; 16, 6 acres, and the remainder had 6 acres or more. In other words, over one-half of the 257 school farms had 6 acres or less. There were 58 farms with over 20 acres. The records of the College of Agriculture of the University of Minnesota showed that one-half of the school farms in that State were rented. There is no information to indicate whether this is true in other States or not, but in several States the law requires that the farms shall not be leased for less than five years, which would indicate that the schools could use rented land.

USE MADE OF THE FARMS.

The reports show that of the 257 school farms, 150 were growing corn; 129, garden crops; 84, potatoes; 75, oats; 61, alfalfa; 42, cotton; 35, wheat; 29, clover; and 20, sweet potatoes.

Out of the 3,900 acres reported by 84 schools, only 12 acres belonging to 22 schools were reported as being used for the raising of laboratory material. Twelve of the 84 schools reported a total of 10 acres used for projects for individual pupils Fifty-two acres were reported as used for school gardens. Some of the larger uses to which the land was put were 827 acres for crop rotation, 593 acres for general demonstrations, 382 acres for raising pure-bred seed for distribution among the farmers and the pupils, 206 for dormitory supplies, 166 for fertilizer demonstration, and 166 for general experiments.

IS A SCHOOL FARM NECESSARY?

A question was asked as to whether the school could conduct its agricultural instruction without a school farm. Of the 104 schools which reported having land 39 replied "yes" and 65 "no." If the

replies were used as they stand they would indicate a majority opposed to the school farm. However, of the 29 having no land, 26 reported that they could get along without the school farm and 3 considered it essential. By taking both those with land and those without land, 65 replied that they could get along without land, and 68 that they could not get along without it. In other words, there is a majority of 3 in favor of school farms. But an analysis of these replies indicated that the schools with the small farm seem to feel that they could get along without the farm in their agricultural instruction, and the schools with the large farms seemed to feel that it was an advantage and that they could not carry on their work without it. The small farms are mostly in the Northern and Eastern States, and the large farms in the Southern States. Most of the schools in the South are more or less of a boarding type, whereas those in the North and East have a large proportion of the pupils who are at home morning and night. Detailed data as to the replies are given in the table below:

Analysis of replies to question "Could you conduct your agricultural instruction successfully without school farm or plat?"

Geographic divisions.	Having land and answering yes.	Having land and answering no.	Having no land and answering yes.	Having no land and answering no.
New England	4	3	6	.....
Middle Atlantic	2	2	8	.....
East North Central	3	1	1	.....
West North Central	27	21	10	2
South Atlantic	1	9	1	.....
East South Central	1	12	.....	1
West South Central	1	17	.....	.....
Total	39	65	26	3

ADVANTAGES AND DISADVANTAGES.

In the first questionnaire the agricultural instructor was asked to state the advantages and disadvantages of the school farm in his work. All the advantages seemed to be educational, and all the disadvantages seemed to be in connection with the management of the school farm. The principal advantages were that the school farm made the instruction real, it gave the student some practical agricultural work, it supplied laboratory material, and it gave the agricultural instructor an opportunity to carry on demonstrations for the benefit of the farmer and his pupils. The principal disadvantages were that help was hard to get, the land poor, and the instructor's time was poorly spent.

From a farm-management point of view a more difficult problem could not be presented to an agricultural instructor than is found in

the school farm as it exists in the Northern and Eastern States. Most of the farms have a small acreage. Sixty-one of the 84 schools in Minnesota depend entirely upon day help, all the team work is hired, and the land is expensive. In Minnesota the average value per acre is $150. It generally takes two or three years to put this land in shape to be used for agricultural purposes. Many farms are without farm buildings. If they have buildings, the investment is high in proportion to the acreage cultivated and to the crops obtained. The majority of them have little or no machinery, so when they want to cultivate or gather their crops they must borrow. The majority have no live stock, so that they have to purchase their manure. It is only in exceptional instances that the agricultural instructor lives on or near the school farm.

MANAGEMENT OF THE SCHOOL FARM.

Considering these factors from a farm-management point of view, it can be readily seen that the agricultural instructor has a peculiar problem on his hands. The majority of them have not been able to solve it satisfactorily. The agricultural instructor who can not make his farm pay has very little standing among the farmers, since as long as the farm does not pay he has to admit that he can not produce crops with a profit. What farmer would have any confidence in such a man? Those schools which succeed must practice an intensive system of agriculture. The school farms which seem to have met with the best success are those which are growing pure-bred corn, pure-bred small grains, potatoes, alfalfa, cabbage, and the like. This gives them a high-priced crop and enables the school to get good seed to be distributed in the neighborhood. Thirty-three of the eighty-four schools reporting on this point were using a part of their land for raising pure-bred seed for distribution. Some had extended this idea to the growing of fruit trees and berry vines to be distributed in a similar manner.

The school adds to its effectiveness if it becomes the distributing center of high-class seed and trees. Indeed, where they have live stock they should develop the same idea by extending the service of the sires in the neighborhood and distributing their young among the farmers. Several instances were found in the South where the boys in the pig-club work were being furnished with pigs from the school farm in the same way that boys in the corn clubs in the North were being furnished with corn from school farms.

KINDS OF WORK PUPILS ENGAGE IN.

The kinds of crops grown and the types of farming carried on have already been ascertained. The next point of interest is the kinds of work that the student is engaged in on the school farm. The three

types that stand out most prominently are the preparation of the land, the planting of the crops, and the harvesting of the same. In most of the agricultural schools the pupil has little or no part in the cultivating of the crops. The different kinds of labor in which the pupils engage are shown in the following table:

Kinds of labor in which students are engaged on the school farm or plat.

Improvement of school ground	2	Mulching trees	2
Gardening	12	Spraying trees	6
Harvesting	1	Dairying	3
Digging potatoes	3	Caring for stock	2
Corn raising	4	Poultry	3
Selecting seed corn	8	Bees	1
Planting grains	2	Greenhouses	2
Planting potatoes	4	Grading land	1
Harvesting alfalfa	1	Drainage	2
Harvesting grains	4	Running survey lines	2
Haying	1	Ditching	1
Picking cotton	1	Terracing	1
Picking peas	1	Applying fertilizers	2
Renovating orchards	1	Preparation of land	10
Orchards	5	Plowing	2
Pruning	3	Harvesting	1
Berry patch	2	Fencing	4
Planting trees	2		

USE OF LAND TO TEACH GENERAL PRINCIPLES.

A question was asked as to whether the agricultural instructor used the land to teach technique or general principles. The invariable answer was general principles. When it is considered that most schools have an average of 30 to 40 pupils to an agricultural instructor and from 5 to 10 acres on which to give them instruction, it can be realized that the student can get but little actual experience in the ordinary farm operations and that the instructor can simply show what has happened under certain conditions.

HOME PROJECTS.

In the second questionnaire several questions were asked in regard to home projects. Seventy-four of the 156 schools reported that their students were doing home-project work, 61 reporting corn, 37 garden, 26 poultry, 25 potatoes, 14 dairying, 12 orchards, 12 alfalfa, and 10 keeping herd records. There was but one report for cotton. That there were few home projects in the South can be readily explained when it is considered that the agricultural schools are of the boarding type and that the districts served are generally congressional districts or some larger area. There seems to be but little supervision by the agricultural instructor except in the New England and Middle

Atlantic States. Instructors in the West North Central States did not visit their pupils on an average of more than three times during the year. The replies indicate that a large number of the instructors had more than 200 miles on their project circuit. Data for home projects reported are given in the following table:

Home projects reported.

Corn	61	Berries	3
Garden	37	Crops	3
Poultry	26	Rotation	3
Potatoes	25	Oats	2
Dairying	14	Cabbage	2
Orchard	12	Barley	2
Alfalfa	12	Pop corn	2
Herd record	10	Bees	2
Fertilizer	9	Cotton	1
Accounts	6	Sweet clover	1
Wheat	5	Tobacco	1
Hotbed	5	Reforesting	1
Beans	4	Cover crop	1
Spraying	4	Cement construction	1
Tomato canning	4	Surveying	1
Pruning	3	Cold frames	1

The returns of the agricultural instructor indicated that the number of farms on the home-project list were higher in the West than in the East, the average for the West North Central States being 33 per agricultural instructor, 8 more than the maximum allowed under the Massachusetts system. These returns indicated that not all of the pupils in the agricultural instructor's class in the North Central States were on his home-project list. In some instances the agricultural instructor had as many as 130 pupils in his classes. In the following table are shown the number of schools reporting and not reporting home projects and the average number of home projects per school:

Number reporting home projects and average number of home-project pupils per school.

Geographic divisions.	Number reporting home projects.	Number not reporting home projects.	Average number of home projects per school.
New England	9	3	12
Middle Atlantic	13	3	16
East North Central	3	2	15
West North Central	35	51	33
South Atlantic	2	5	18
East South Central	.....	13	.....
West South Central	12	1	9

EXTENSION WORK OF AGRICULTURAL INSTRUCTOR.

Over one-half of the agricultural instructors reported that they were engaged in some kind of boys' and girls' club work, and in the majority of instances they were acting as local leaders, although in some cases they were merely cooperating. Eighty-one of the 157 agricultural instructors indicated that they were doing other types of extension work. The principal types were organizing farmers' clubs, cow-testing and live-stock work, seed selection, speaking at meetings—generally in connection with their farmers' clubs, and giving advice to individual farmers. Details as to the kind of extension work carried on by the agricultural instructor are shown in the following table:

Principal kinds of extension work reported.

Spraying	8	Alfalfa plats	15
Pruning	2	Weed identification	2
Associations	6	Corn club	8
Grange work	3	Seed corn	6
Organizing clubs	7	Wheat breeding	5
Farmers' club	16	Demonstration	12
Speaking at meetings	15	Experiments	5
Cow testing	8	Consultations	4
Testing milk	10	Farm visits	3
Dairy improvement	4	Fertilizing	3
Purchase of live stock	2	Answering questions	4
Hog cholera	8	Soil drainage	6
Assist in vaccinating hogs	2	School contests	7
Stock improvement	2	Advice	9
Care of cattle	2	Lecture work	9
Introducing pure-bred seeds	3	Poultry club	2
Seed testing	4	Plowing	3

Records of the College of Agriculture, University of Minnesota, show that of the 117 agricultural instructors in Minnesota reporting in regard to extension work, 92 stated that they had organized 273 farmers' clubs; 35, shipping associations; and 31, cow-testing associations, testing 42 herds containing 960 cows. In five instances the boys in the agricultural classes were doing the testing. The instructors were also carrying on farm-demonstration work in corn, barley, alfalfa, and small grains. Twenty-three of the schools had taken part in the vaccination of hogs for cholera, 73 had helped in planning and building silos, and 29 had helped to plan farmsteads.

A question was asked as to whether the agricultural instructors were employed for nine months or for the entire year, to learn whether they could carry on home-project work. Ninety-nine out of the 157 were so employed. One hundred and thirty-one were graduates of agricultural colleges, and their average salaries were between

$1,200 and $1,300. Thus far the land and the agricultural instructor have been considered. The next and most important feature is the pupil.

SOURCE AND DISTANCE FROM SCHOOL OF PUPILS STUDYING AGRICULTURE.

The returns indicated that 40 per cent of the pupils studying agriculture were living at home on farms, 40 per cent were living at home but not on farms, and 20 per cent were boarding during the school year. In other words, 60 per cent of the pupils studying agriculture were from farm homes, and one-third of them were not at home during the school year. In the East North Central and West North Central States 43 and 47 per cent, respectively, of the pupils were not from farms. In the New England and Middle Atlantic States about 60 per cent were living at home on farms. The following table shows the distribution by geographic divisions and by residence of the pupils studying agriculture, as reported in the questionnaire:

Sources of pupils studying agriculture.

Geographic divisions.	Total number studying agriculture.	Number living at home on farms.	Number living at home not on farms.	Number not living at home during school year.	Average maximum distance from which pupils are drawn.
					Miles.
New England	272	162	29	81	8.41
Middle Atlantic	391	224	132	35	7.36
East North Central	245	78	106	61	9.40
West North Central	3,233	1,233	1,546	454	11.30
South Atlantic	447	219	106	122	18.12
East South Central	801	259	187	355	21.69
West South Central	481	181	266	34	8.92

Since such a large percentage of the pupils are not living at home the average area from which they are drawn was ascertained. The returns, as the above table shows, indicated that in the New England and Middle Atlantic States the maximum distance is on the average 8 miles; in the East North Central and West North Central States between 10 and 12 miles, and in the South, where the schools have a boarding department, the areas are even larger. If the student lives more than 4 miles from the school and goes and comes each day, it would be practically impossible for him to take any part in the farm operations unless he did it on Saturday.

RELATIVE PROPORTION OF BOYS AND GIRLS STUDYING AGRICULTURE IN HIGH SCHOOLS.

The returns to the Bureau of Education for 1913[1] indicated that one-third of the high-school students studying agriculture in the United States were girls. In many of the agricultural classes visited the number of girls exceeded the number of boys. When the instructor was asked why so many girls were in his classes, he replied that if the girls were to teach in the rural districts they would be required to pass an examination in agriculture, and so were attending his classes for this purpose. It would seem that this fact would call for a modification in the methods of teaching agriculture and in the use of the school land and the home project. In the following table are included all schools which have courses in agriculture, whether they receive State aid or not. Of course, they comprise a much larger number than were used in obtaining information in regard to the use of land. This table shows the relative number of boys and girls studying agriculture.

Number of public high schools reporting agricultural courses, and number of pupils in attendance.[1]

Geographic divisions.	Schools reporting.	In agricultural courses.		
		Boys.	Girls.	Total.
United States	1,414	19,749	10,076	29,825
North Atlantic Division	132	1,524	507	2,031
North Central Division	742	8,730	5,356	14,086
South Atlantic Division	136	1,922	958	2,880
South Central Division	267	5,024	2,729	7,753
Western Division	137	2,549	526	3,075

THE PERIOD BETWEEN GRADUATION AND STARTING FARMING ON OWN ACCOUNT.

It can safely be assumed that the average boy leaves school at 18 years of age. From the best information available the average farmer does not start farming on his own account until he is somewhere between 25 and 30 years of age. In other words, there is a period of the farmer's life, when he is between 18 and 30 years of age, when he is not working on his own farm nor is he his own master. It would seem that wherever the home-project method has been introduced an effort should be made to follow up the boy and, if possible, arrange in some way for him to continue his home-project work and gradually becomes a partner with his father in the farm business. This feature should be a part of the extension work of the agricultural instructor.

[1] Rpt. Comr. Education [U. S.], 1913, II, p. 489.

AGRICULTURAL SCHOOL AND THE SHIFTING-TENANT PROBLEM.

Farmers are recruited from two sources, from the sons of farmers and the sons of agricultural laborers. In going over the original census schedules of 1910 for farmers of Iowa County, Wis., this rather interesting fact developed, that where the tenant and landlord had the same name the tenant had been on the farm that he was on the day the census was taken for a much longer period than where their names were different. It was found that 31 per cent of the cash tenants who were related to the owner had been tenants on the farms which they were on, at the census date, for two years or less, while the per cent for those where no relationship existed was 65. For share tenants the figures were 50 and 80 per cent respectively. In other words, where there is relationship there is less of the shifting-tenant problem than where relationship does not exist. From other records it was learned that of the total years a man had been a tenant, he had been a tenant on the farm where he was at the time the records were taken 76 per cent of the total time when kinship existed and 50 per cent when there was no relationship. The returns also indicated that where relationship existed 33 per cent had attended high school, but where there was no relationship only 18 per cent had attended high school. In other words, if through the school the farmer could be made to take an interest in the agricultural training of the boy and they could be established in a partnership relation, the shifting-tenant problem would be partially solved.

EFFICIENCY IN AGRICULTURAL PRODUCTION.

It should be remembered in all vocational training that the boy or girl is always of greater importance than the subject taught. Much is said in these days in regard to the superiority of European agriculture compared with that of the United States. If Germany is taken as an example and the yields per acre compared with those of the United States, it would appear that Germany is 50 per cent more efficient than the United States. But the average German agricultural laborer cultivates but $7\frac{1}{10}$ acres, whereas the average agricultural laborer in the United States cultivates over 27 acres and produces two and one-half times as much as the German laborer, measured by the crops obtained.

According to G. F. Warren the four principal factors in efficient farming are the size of the business, diversity of crops, crop yields, and production per animal. A large production per acre may not indicate that the farm is being used to the greatest advantage. It was important to determine whether the agricultural instructors were considering this in marking their pupils. Consequently they were asked what standard they had adopted in giving the boy a passing

mark in his farm work. The replies indicated that if the boy passed his examination on work in the classroom and laboratory his efficiency in performing the farm operations was of little importance.

THE PLACE OF PERSONAL EFFICIENCY IN AGRICULTURAL INSTRUCTION.

Two other questions were asked to determine whether the agricultural instructor had anything definite in mind in the practical work that he gave the boy. Either the questions were not understood, or the instructor had not considered this phase of the work. The two questions were whether he had standardized any of the principal farm operations in the community, and also to give standard movements or processes in the principal farm operations of his community. None of the answers seemed to indicate that the agricultural instructor had analyzed the farm operations in which the pupils were engaged. Apparently most of the agricultural instructors are requiring of the boy that he get a certain piece of farm work done, and no effort is made to show the boy the most efficient method of performing that operation. It would seem that in this respect the agricultural instructor laid more emphasis on growing a crop than on developing the boy. It would seem especially important that the agricultural instructor should increase the efficiency of his pupils in those phases of farm operations which limit the area cultivated or the number of animals kept.

SUMMARY.

The principal facts developed by this investigation were that in the New England States the majority of the pupils are living at home and have easy access to the school, that the school farms are small, and that the home project is more or less closely supervised, also that the majority of the agricultural instructors are of the opinion that they could easily get along without the school farm.

In the North Central States the school farms are small, the pupils are drawn from greater distances than those in the New England States, and they have not as good means of transportation. It is also evident that there are a large number of boys from towns and cities, and of girls desiring to become teachers, in the classes studying agriculture.

In Minnesota the agricultural instructor has not only to teach but to do extension work, with the result that he has more than he can properly care for. The part that he would like most to neglect is the school farm. Wherever the home project has become a part of his method of teaching agriculture he has not had the time properly to supervise or to work out the details. For these two parts of the country the reasons given for the desire to do away with the school

farm are not educational but pertain to the management of a farm of uneconomical size. Since the primary purpose of the school farm is educational, this should not count in making a decision. The considerations that should decide are whether the school farm could be used to make the agricultural workers of that community more efficient, or whether some other method could be devised to take the place of the school farm, as, for example, the home project.

In the South, the majority of the agricultural schools have a boarding department and a large farm, so that the agricultural pupils have a better opportunity to participate in the farm operations, and home projects have not been developed; but even in these schools, where the pupils carry on the farm operations under the direct supervision of the agricultural instructor, it would seem that not enough attention has been paid to making the pupils efficient in the ordinary farm operations and too much attention has been given to getting the farm work done. Thus, the use of land in agricultural teaching presents three different and distinct problems which have no common ground for working out their solution.

The returns indicated that some of the things that could be done most extensively by all the schools having farms are the distribution of pure-bred seed, the introduction of new varieties of plants, fruits, and shrubs, and the extending of the services of pure-bred animals in the community.

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